the Bergendahl Institute, LLC

Maintaining Quality Performance in a Rapidly Changing Workplace

2009 NASA Occupational Health Meeting

Cleveland, Ohio

July 2009

The Bergendahl Institute

The Bergendahl Institute's mission is to transfer to the U.S. Healthcare system and other industries, 25 years of proven human error management techniques from the U.S. Nuclear Power Industry

Where Healthcare and Nuclear Power Meet

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Nuclear Powered Patient Safety Programs

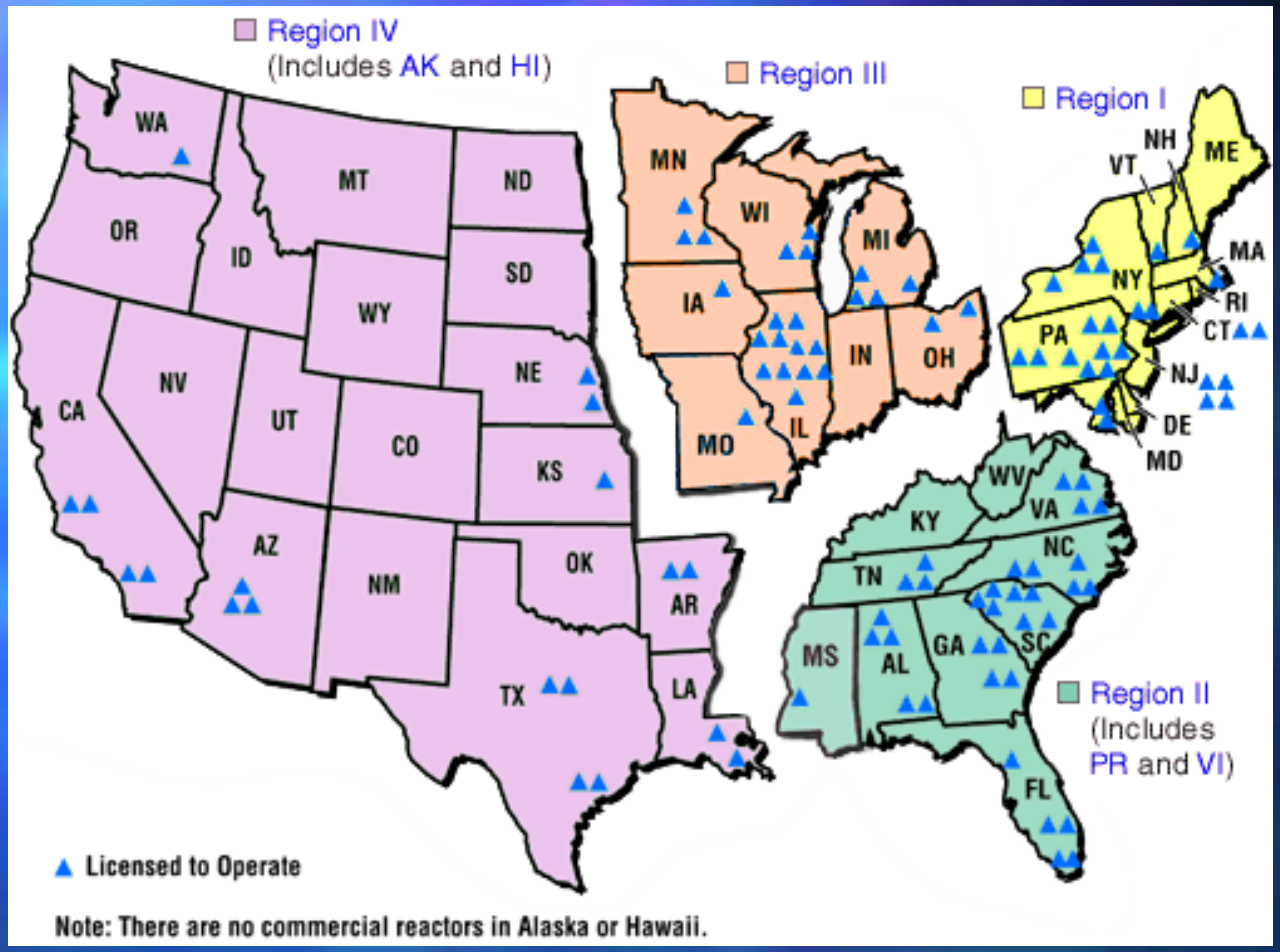
What does Nuclear Power have to do with us??

Common Challenges

- Changing Requirements
- Cost Reduction
- Resources / Staffing
- Increasing workload
- New Executives, Board members
- Surveyors / Inspectors

People Are People

It doesn't matter where they get their paycheck


Region IV
(Includes AK and HI)
Region III
Region I
Region II
(Includes PR and VI)
WA
OR
CA
ID
NV
MT
WY
UT
AZ
CO
NM
ND
SD
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IA
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OH
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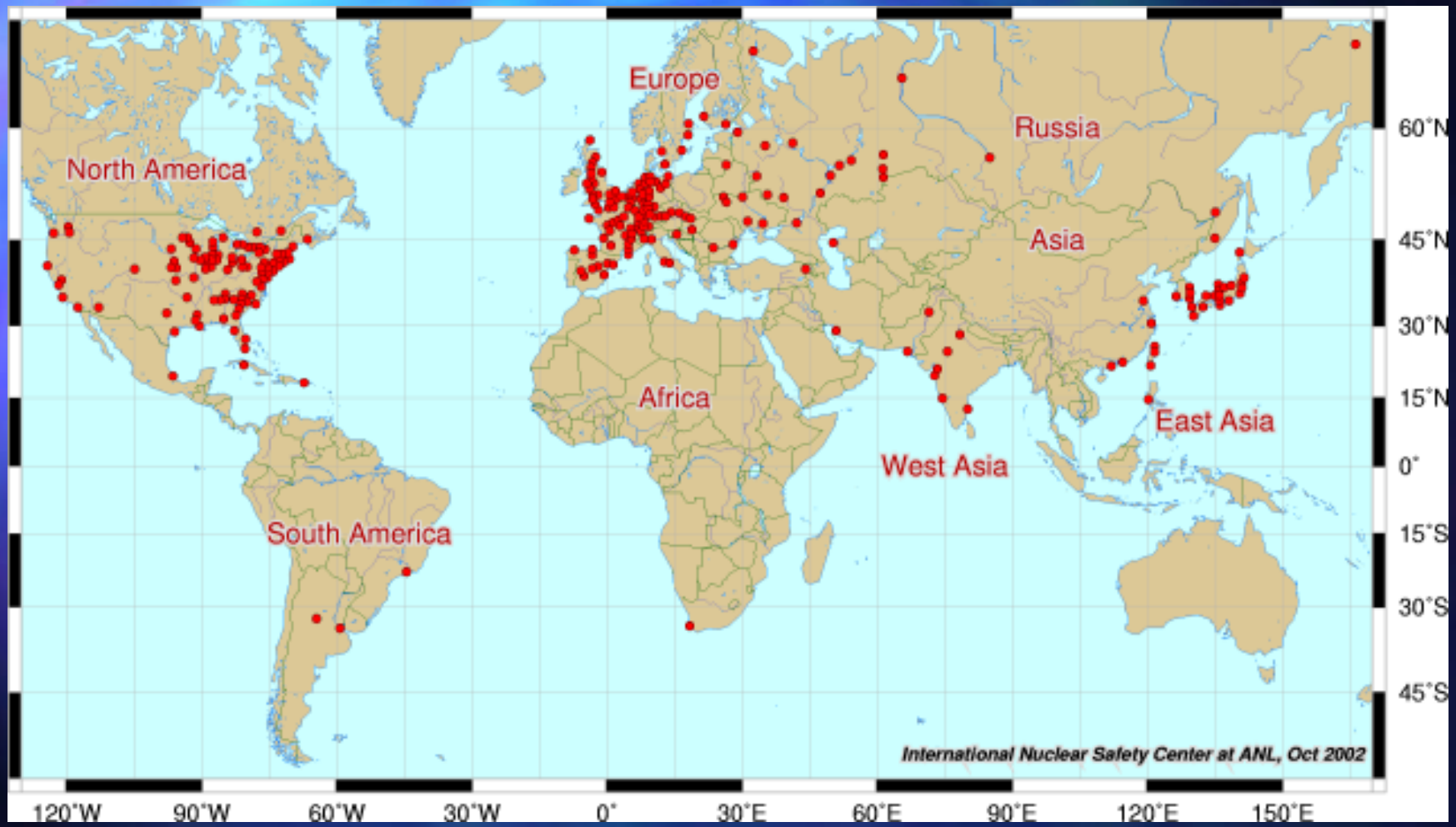
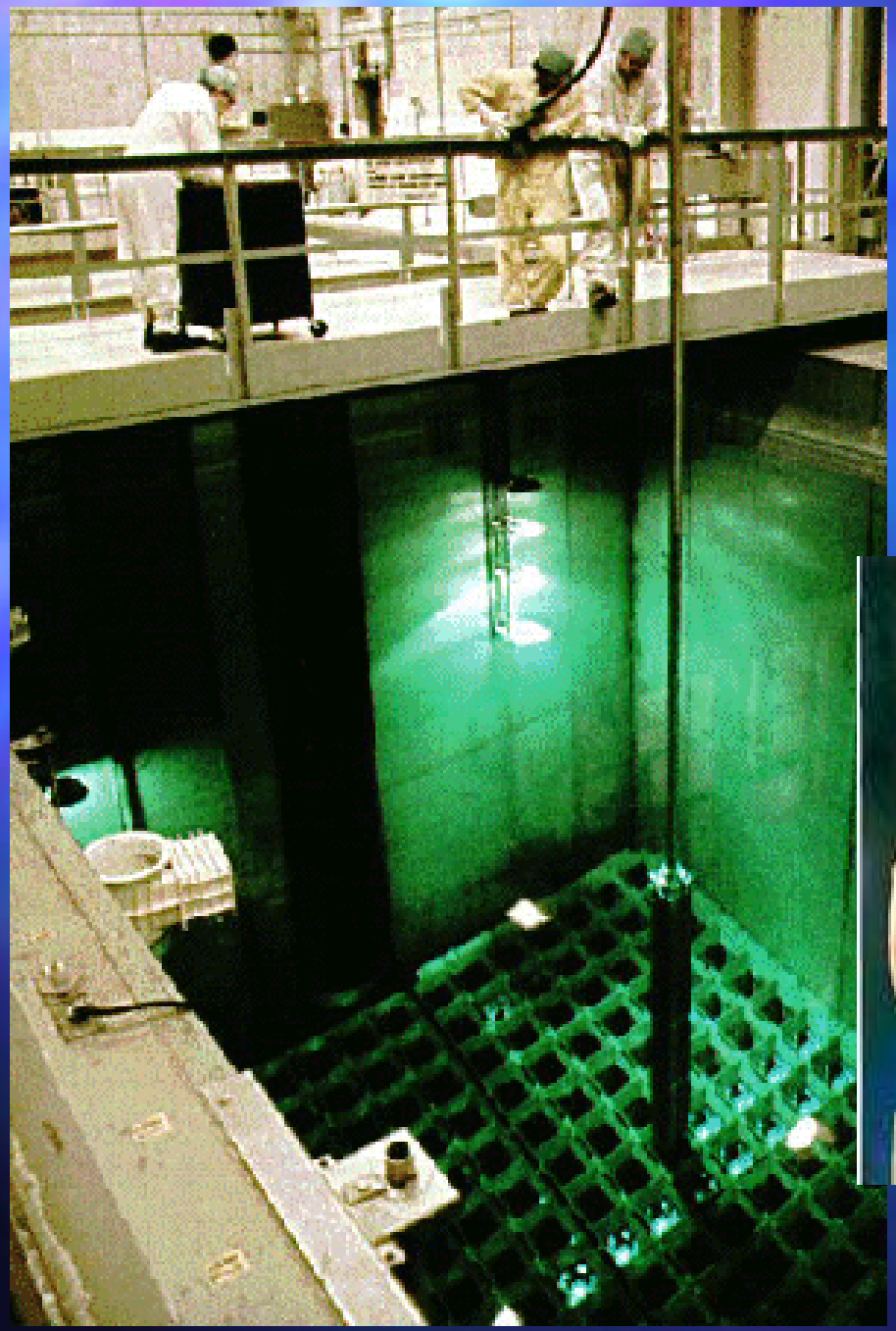
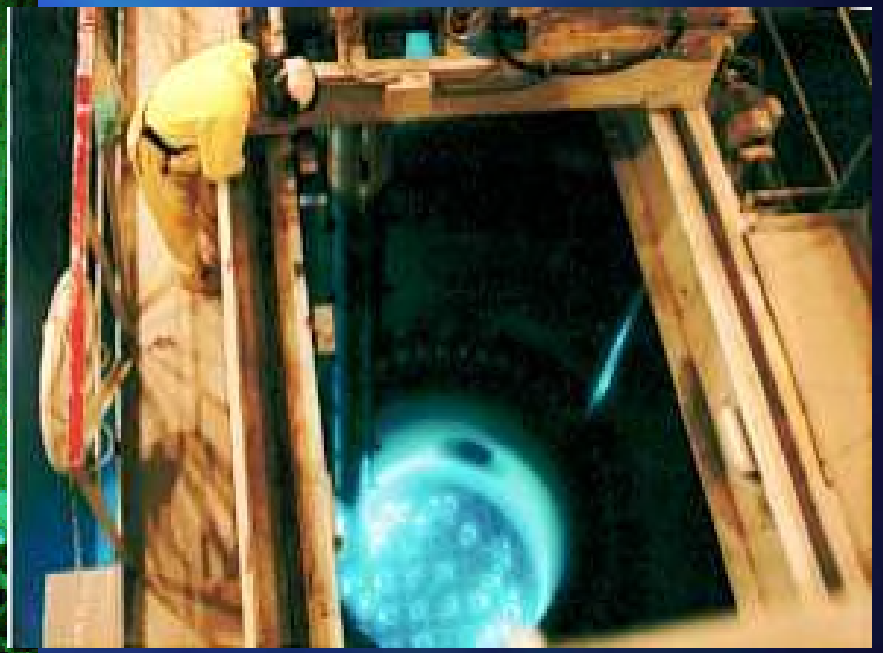
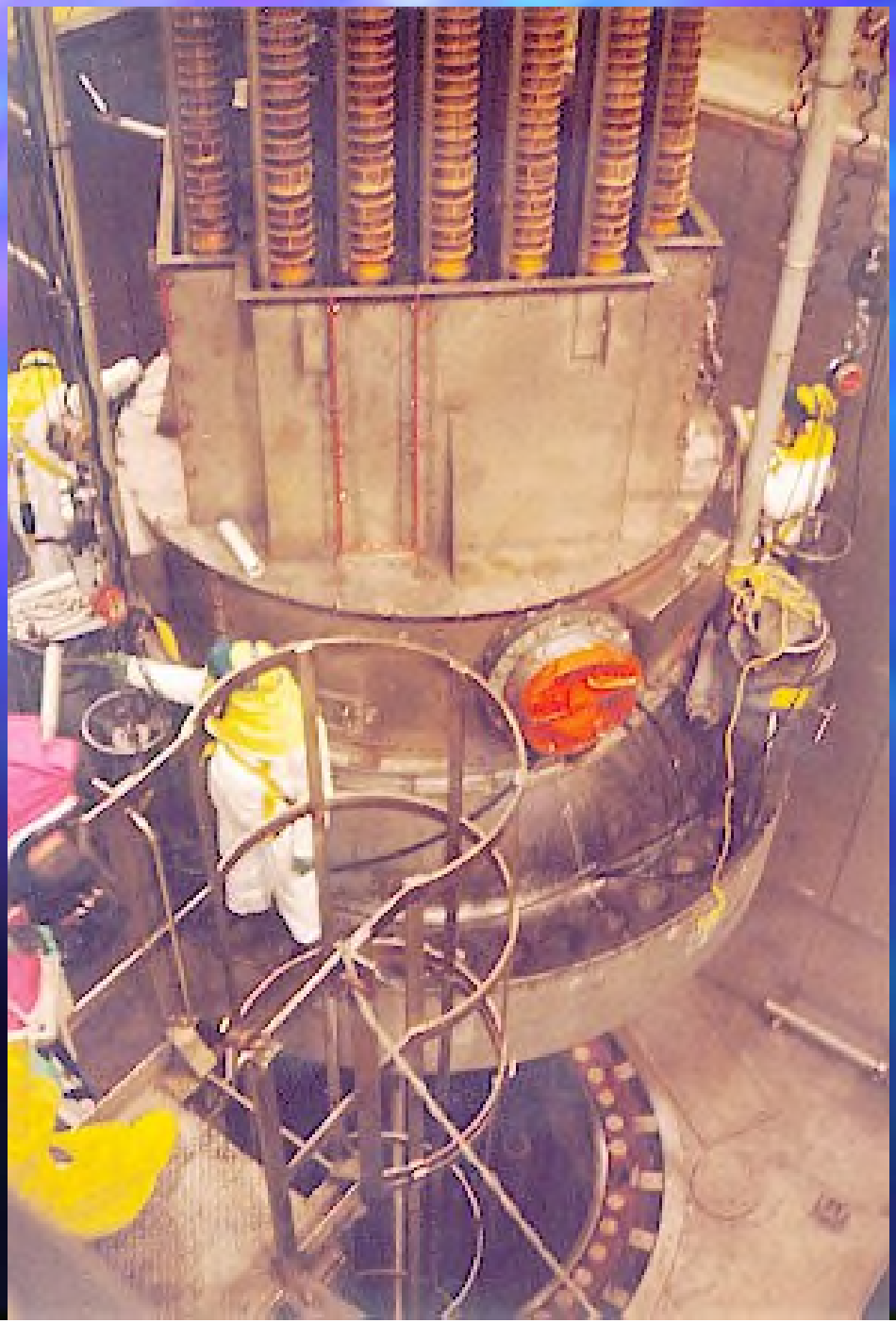
Licensed to Operate
Note: There are no commercial reactors in Alaska or Hawaii.


Europe
Russia
North America
Asia
Africa
East Asia
West Asia
South America
International Nuclear Safety Center at ANL, Oct 2002
60°N
45°N
30°N
15°N
0°
15°S
30°S
45°S
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E

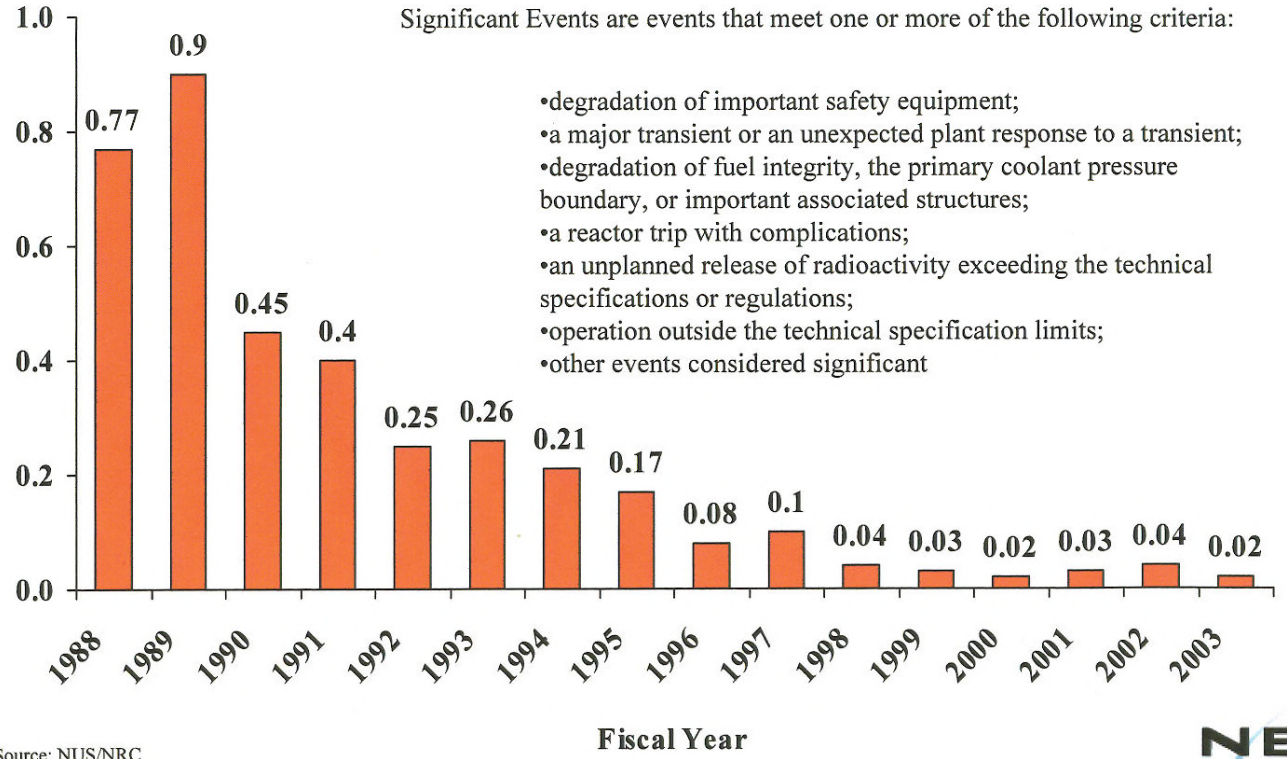






Significant Events at U.S. Nuclear Plants: Annual Industry Average

(1988 – 2003)



Significant Events are events that meet one or more of the following criteria:

- degradation of important safety equipment;
- a major transient or an unexpected plant response to a transient;
- degradation of fuel integrity, the primary coolant pressure boundary, or important associated structures;
- a reactor trip with complications;
- an unplanned release of radioactivity exceeding the technical specifications or regulations;
- operation outside the technical specification limits;
- other events considered significant

Source: NUS/NRC

NEI

NUCLEAR ENERGY INSTITUTE

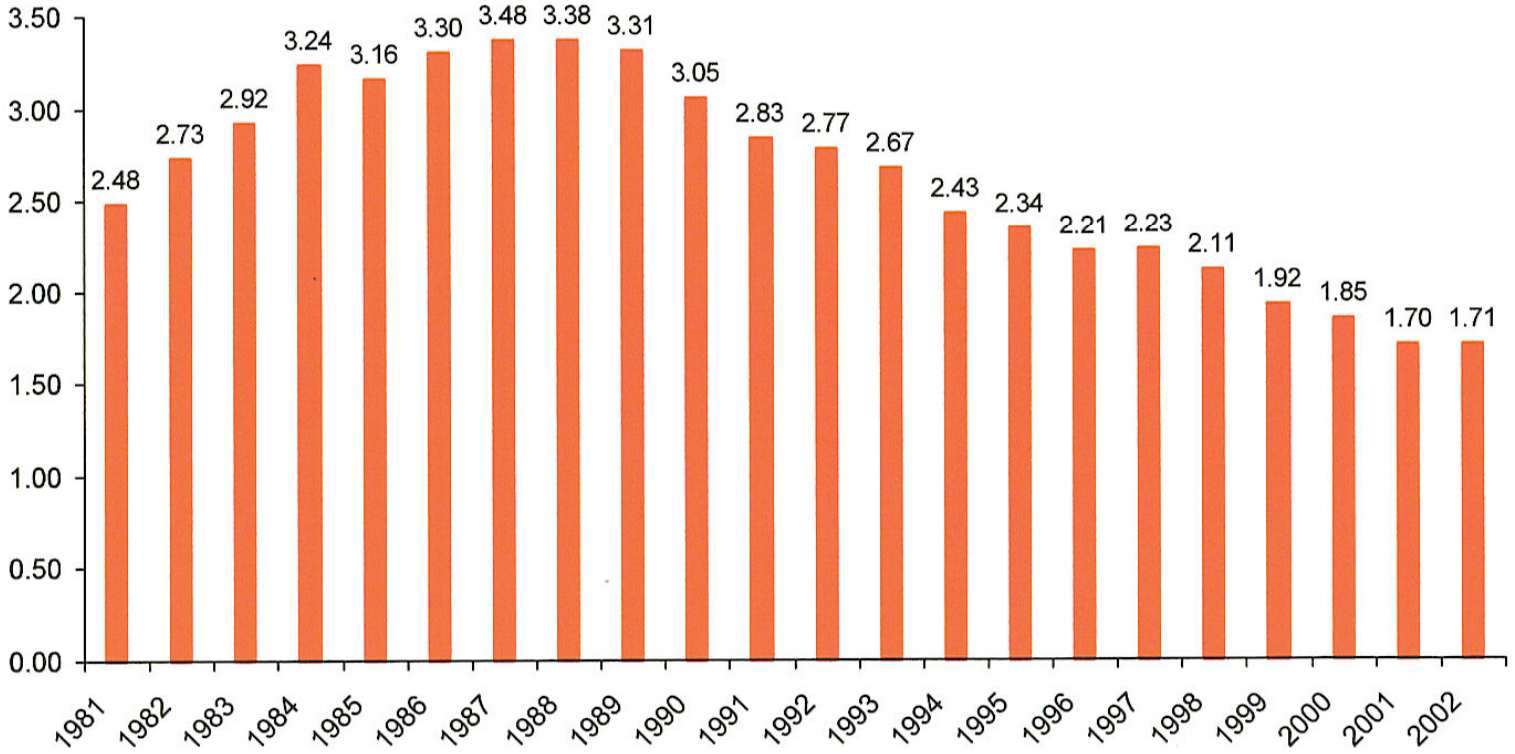
U.S. Nuclear Industry
Net Capacity Factors (1980-2002)

Year	Capacity Factor (%)
1980	57.6
1981	60.5
1982	58.3
1983	58.2
1984	58.3
1985	63.3
1986	60.4
1987	62.0
1988	65.1
1989	63.5
1990	67.5
1991	70.2
1992	71.3
1993	72.5
1994	75.1
1995	78.8
1996	76.6
1997	72.1
1998	79.5
1999	86.8
2000	89.6
2001	90.7
2002	91.9

Source: UDI

Average US Nuclear Industry Production Costs (1981-2002)

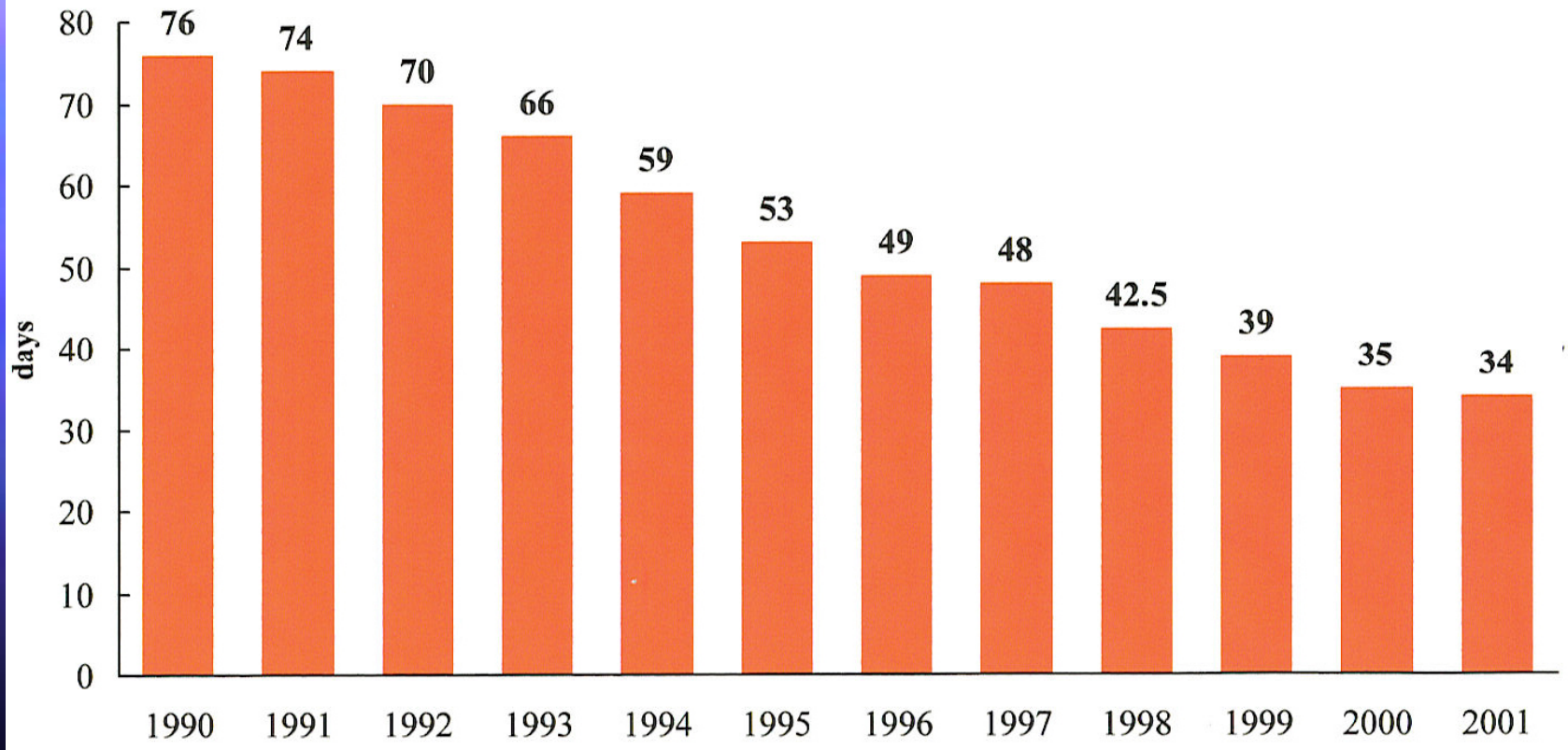
(in 2002 cents per kilowatt-hour)



Source: RDI/EUCG

Median Duration of U.S. Nuclear Plant Refueling Outages

(1990-2001)



Source: Institute of Nuclear Power Operators (INPO)
Note: Median Values do not include data from shutdown units

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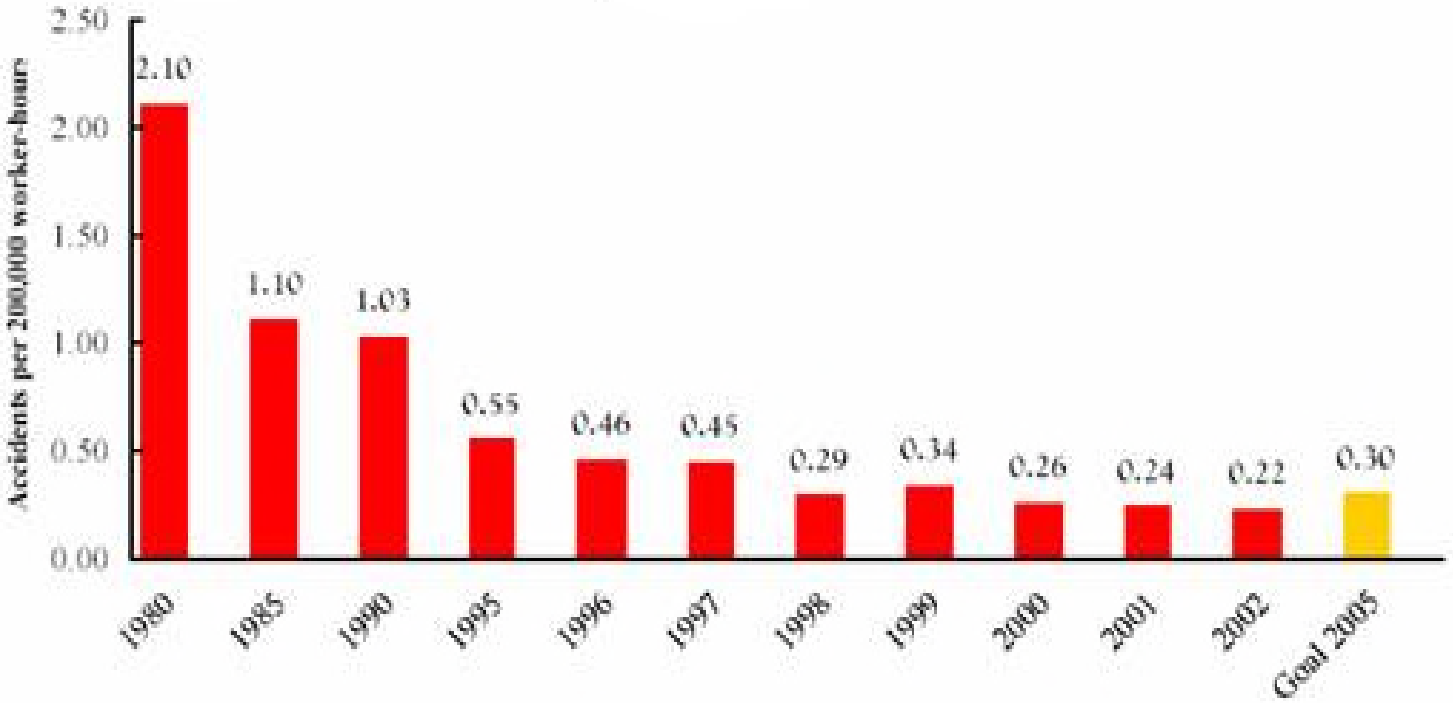
Industrial Safety Accident Rate

(US Nuclear Power Industry)



Source: WANO 2002 Performance Indicators

NEI

Early 1980's

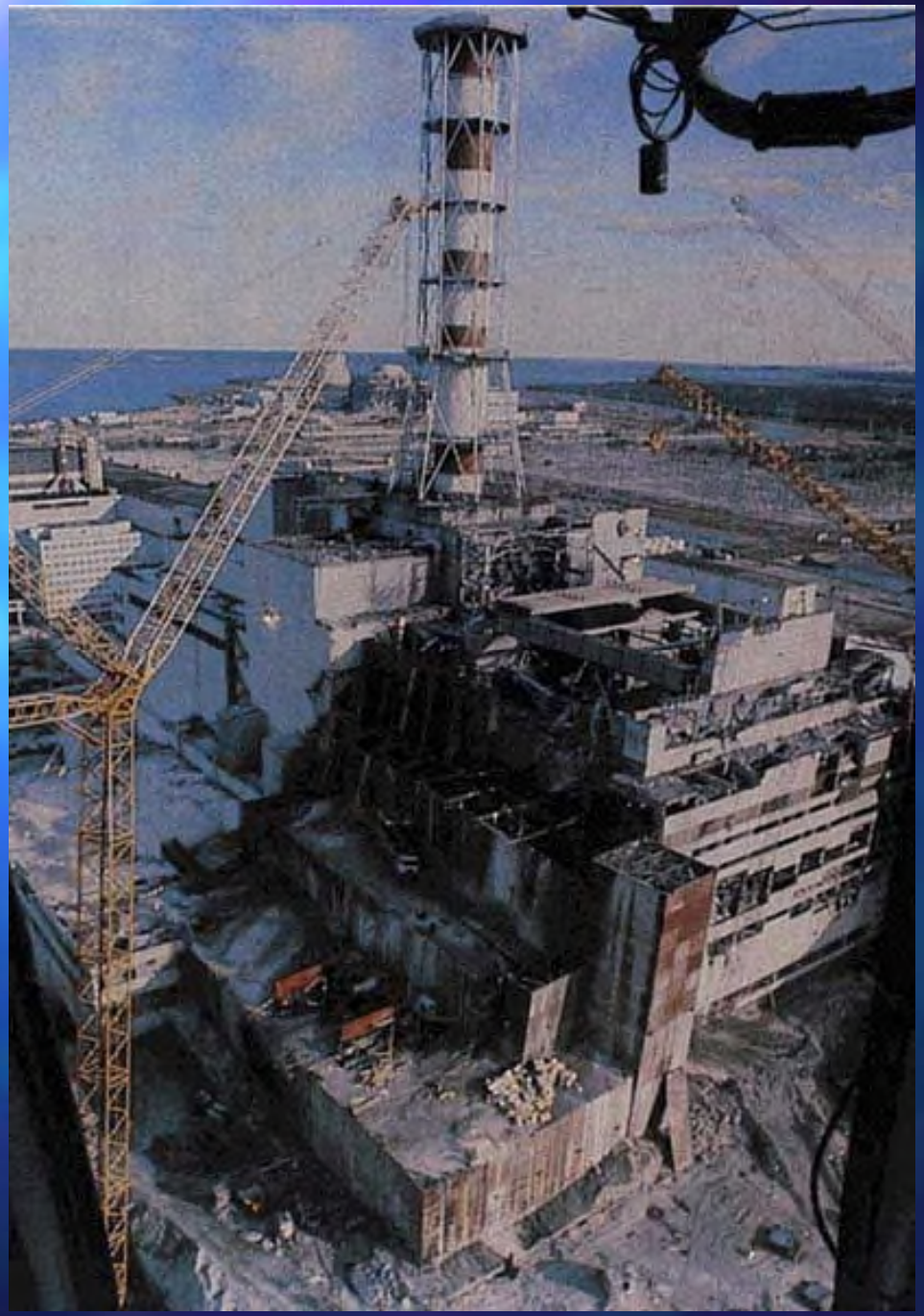
- Denial - "we're different"
- Many events occurring
- Superficial cause analysis
- Cause = Human error or equipment
- Blame / Accountability emphasis

Mid 1980's

- Fewer events, cause = process
- Computerize / Barcode
- Color code
- Standardized Terminology
- Checklists
- Overloaded with action items

1986

- Chernobyl
- Challenger



1990's

- Advanced Root Cause Analysis
- Underlying causes (ask why?)
- Lower threshold (near misses)
- Look at the Organization contribution
- Look at the behaviors and relationships
- First started to consider Culture

Recent Events

- 2002 Davis Besse Nuclear Plant
- 2003 Columbia Space Shuttle
- "Safety Culture"

Phases of Error Management progress in Nuclear Industry

- Phase 1; **"Denial"**
  - Many significant events occurring
  - Typically a superficial root cause performed with equipment design or "human error" cited as cause
  - Pitfalls - action selection based on politics, not based on eliminating reoccurrence

Error Management Phases continued

- Phase 2; "**Focused on fixing**"
  - Fewer events, improved Root Cause Analysis
  - Identifying system causes such as training and procedures
  - Pitfalls - overloaded with action items

Error Management Phases continued

- Phase 3; "**Focus on learning**"
  - Advanced cause analysis and lowered threshold, begin trending smaller issues
  - Improving systems and processes, comparing performance between groups
  - Pitfalls - "Analysis paralysis", everything treated as an issue to be studied

Error Management Phases continued

- Phase 4; "**Focus on educating**"
  - Identify cultural contributors causing behaviors of concern (by asking why after the apparent root cause is identified)
  - group dynamics considered/improved, all staff members included in training
  - Pitfalls - trying to fix with one session

Error Management Phases continued

- Phase 5; "**Continuous improvement**"
  - Proactive measures including; extensive use of change management techniques, trending precursor conditions/behaviors
  - efforts shifted to prevention using widespread behavior observation and reinforcement
  - Pitfall - complacency

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Principles

- Even the best people make mistakes
- Error-likely situations are predictable
- Individual behavior is influenced by the organization culture and values
- People achieve more with encouragement and reinforcement from leaders
- Events can be avoided using lessons leaned from pa s

Sources of the ideas and techniques

- Reduce workplace injuries……..Petrochemical
- Teamwork/Communications……Aviation
- Process Improvement……Manufacturing
- Training……Military
- Contamination Control……Healthcare

Top Ten Error Traps
(*conditions which create risk*)

1. Stress
2. High work load
3. Time pressure
4. Poor Communications
5. Vague or poor work guidance
6. Overconfidence
7. First time performing task
8. Distractions
9. First day following time off
10. 30 min after wake up or meal

Which of these are associated with Organizational Change?

1. Stress
2. High work load
3. Time pressure
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Leadership Role and Emphasis

- Behaviors of the people are closely monitored and positively reinforced
- Process improvement initiatives are proactive and based on “conditions of risk” versus near misses or events
- Focus on a culture of continuous improvement with everyone in the organization involved

Leadership Role and Emphasis

1. Facilitate clear and open communication
2. Promote Teamwork
3. Reinforce desired behaviors
4. Eliminate organizational weaknesses (processes, training, unclear policy)
5. Value error prevention/learning

Process "Tools"

- Required Briefings/Time outs
- Comprehensive Reporting systems
- Required Turnover/hand-off meetings
- Observation / Walk Around programs
- Root Cause Investigations
- Self Assessments/3rd party Assessments

Culture "Tools"

- Awards, "catch of the week" program
- Management 3 C's meetings
- 360 degree Surveys
- Measuring successes
- Critiques/Lessons Learned

Adopted from INPO

This is what we learned in the Nuclear Industry over the last 30 years

What have I learned as an Individual?

What can we do as individuals?

- When the changes keep coming
- When the “Organization” isn’t doing all the “right” things
- When it seems overwhelming

What can you do as an individual?

1. No Fear
2. No Judging
3. No Anger
4. Give/Share
5. Connect

What can you do?

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No Fear

- Root Cause Investigations repeatedly find those involved say " I was worried/afraid that…." and bad decisions follow
- Error likely if anxious/uncertain
- Fear of embarrassment/group think
- Embracing change versus resisting (due to fear) changes your perception and other people's perception of you
- Focus on NOW

What can you do?

No Judging

- You can only see from your perspective
- "Stupid decision by Management, I don't like this"
- "I know where this is headed"
- Let root cause work, listen/erroneous assumption
- Allow your senses to perceive actual conditions
- Get sufficient information don't assume
- These thoughts are distractions, focus on what

What can you do?

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No Anger

- Error Trap –stress/distract
- Stress from change will cause short fuse
- Loose temper at work = permanent impacts
- Distracted by thoughts – error likely
- Cause is usually someone not doing what you want (not under your control)
- Not personal, it's a job

What can you do?

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Give/Share

- High workload is an error trap
- Help those under high pressure/overload
- Communicate more with new people
- Unfamiliarity = error likely, ask for help
- Organization feels no pain or sympathy you need to look out for each other (Management can treat people as fuel)
- You get what you give

What can you do?

Connect

- Error trap – to be overconfidence
- Learn from others
- Other industry, organization, department
- You are not alone
- Teach, team up , reverse briefing
- Question; are you OK?, is this right?
- Peer Checks are very effective
- Teamwork

What can you do?

1. No Fear
2. No Judging
3. No Anger
4. Give/share
5. Connect

Closing Thoughts

- Human behaviors and cultural risks are not unique to any one workplace "People are People"
- With changes like new contracts, new people, new equipment, new procedures and new programs use tools that are out there "Don't Learn the Hard Way"
- Leadership can create a culture which makes quality, event –free performance easier, BUT
- You ultimately control how you behave and the quality of what you do